the changes in hand-drawn markings).

IN THE CLAIMS:

Please amend claims 4-6 as shown on the attached sheets (including a clean version of the amended claims and a copy of the amended claims showing the changes with brackets and underscoring). Also, please add new claims 13-19 as shown on the attached sheet.

REMARKS

Upon entry of the present Preliminary Amendment-A the claims in the application are claims in the application are claims 1-19, of which claim 1 is independent.

The title, drawings, specification and claims 4-6 are amended in a manner as suggested by the Examiner. New claims 13-19 further define aspects of the invention.

Applicant respectfully submits that all of the above amendments are fully supported by the original application, and that no new matter is introduced by the same.

Applicant also respectfully submits that the above amendments overcome the Examiner's objections and rejection presented at items 2-5 and 7 of the Office Action, and it is respectfully requested that such objections and rejection be reconsidered and withdrawn.

Rejections Based on You et al. (US Patent Application Publication No. 2001/002911 A1)

The Examiner has rejected of claims 1, 2 and 9 under 35 USC §102(e) as being anticipated by You et al. (US Patent Application Publication 2001/0029111), presented at item 9 of the Office Action. It is the Examiner's position that You's disclosure, including the discussion at paragraph [0153] meets all of the limitations of the rejected claims and achieves the same purpose as the present invention.

Applicant's Response

Upon careful consideration applicant respectfully traverses such rejection, and submits that claims 1, 2 and 9 are clearly patentably distinct over the You reference, because You's disclosed method(s) of forming low dielectric constant coating films does not include the specific temperature-based limitations set forth in present claim 1. Particularly, claim 1 defines that the

oxygen concentration in the atmosphere surrounding the material to be treated is reduced to ≤ 1% *before the surface temperature of the material rises to 200°C*, and is maintained at such level while the material is heated to ≥400°C and then lowered to 200°C. As discussed in applicant's disclosure, e.g., pages 2-4, such control of the oxygen concentration relative to the prescribed temperatures permits a favorably low dielectric constant of the coating film to be achieved even in a processing such as a damascene method.

Conversely, while You's disclosed method(s) involve use of an inert atmosphere (≤ 1% oxygen) during the curing stages of his coating film formation, as noted by the Examiner with reference to paragraph [0153] of You's disclosure, such curing stages are disclosed as *starting at temperatures above 200°C*. See the discussion of You's curing stages at his paragraphs [0143] - [0152], which involve temperatures ranging from 250°C to 500°C. You never indicates any initial curing temperature for any material to be as low as 200°C. This is directly contrary to the claimed

While You discloses other processing steps for his coating film which are conducted at temperatures of <200°C, i.e., evaporation of solvent from the films and reflow of the films, You's discussion of an inert atmosphere at his paragraph [0153] is *expressly limited to curing stages*. Moreover, while You indicates that his invention achieves a purpose similar to that of the present invention, he does not address or appreciate the significance of the 200°C starting temperature limit, as discovered by the present inventors.

In this regard, applicant respectfully submits that the Examiner allegations regarding You's disclosure, particularly in relation to his paragraph [0153], are not supported by his actual disclosure.

Based on the foregoing, applicant respectfully submits that the rejection of claims 1, 2 and 9 under 35 USC §102(e) based on the You et al. reference is overcome, and accordingly it is respectfully requested that such rejection be reconsidered and withdrawn.

Rejections Under 35 USC §103(a)

The Examiner has also rejected claims 3-8 and 10-12 under 35 USC §103(a) as being unpatentable over You et al. as applied above and further in view of Sloan (US Patent 5,431,700) and/or applicant's admitted prior art of the dual damascene method shown in Figs. 1(a) - 1(h) (AAPA) or the treatise discussion of Wolf et al. relating to silicon processing through damascene methods, presented at items 11-13 of the Office Action. It is the Examiner's position that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify You's disclosed method to include the temperature control features taught by Sloan, and to further process the interlayer insulation layer by a damascene method based on the teachings of AAPA and/or Wolf et al.

Applicant's Response

Upon careful consideration applicant respectfully traverses such rejections, and submits that claims 3-8 and 10-12 are clearly patentably distinct over the applied references, based on the foregoing arguments regarding the deficiencies of You et al. as discussed above relative to claims 1, 2 and 9, which are not overcome by any additional teaching of Sloan, Wolf or the dual damascene method shown in Figs 1(a) - 1(h)

In view of the foregoing, applicant respectfully submits that the rejections of claims 3-8 and 10-12 under 35 USC §103(s) based on You et al., Sloan, Wolf and AAPA are overcome, and accordingly it is respectfully requested that such rejections be reconsidered and withdrawn.

The additional references cited by the Examiner, Matsuyama et al., Hongo, Schaper et al. and You et al., have been considered by applicant, but it is respectfully submitted that these additional references fail to overcome the deficiencies of You et al., Slaon, Wolf et al. and AAPA discussed above relative to the present claims.

New claims 13 - 19 are believed to be allowable over the references of record based on the foregoing arguments concerning the merits of claim 1, as well as on the merits of the additional features set forth in the new claims.

Conclusion

In conclusion, applicant has overcome the Examiner's objections and rejections set forth in the Office Action, and moreover, applicant respectfully submits that the application is now in condition for allowance, and a notice to that effect is earnestly solicited.

Favorable consideration is respectfully requested.

Pursuant to MPEP §2001.06(b), applicant respectfully submits that the present invention may be considered related to co-pending US patent application serial Nos. 09/382,182 and 09/912,119, which are commonly owned by the owner/assignee of the present application, Tokyo Ohka Kogyo Co., Ltd. Applicant respectfully submits that the present application claims subject matter which is patentably distinct from that claimed in the co-pending applications.

Respectfully submitted,

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CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being submitted via facsimile transmission to the US Patent & Trademark Office, Art Unit 2813, on July 17, 2002.

Joseph P. Carrier

JPC/ms
enclosures

Marked-Up Copy of Title

A METHOD [FOR] OF FORMING A COATING FILM ON A PLATE-LIKE WORKPIECE USING TEMPERATURE AND OXYGEN CONCENTRATION CONTROL

✓ Clean Copy of Title

A METHOD OF FORMING A COATING FILM ON A PLATE-LIKE WORKPIECE USING TEMPERATURE AND OXYGEN CONCENTRATION CONTROL

Marked-Up Portions of Specification

Heading at Page 1, line 6.

2. DESCRIPTION OF [RELEVANT] PRIOR ART

Paragraph at Page 1, Lines 7-15

Demands for high integration of semiconductor devices are constantly increasing and a new generation of 0.15 μm gate lengths is now here. For such cases, it is known that improvement can be obtained in the properties of semiconductor devices by using Cu as wiring material, in place of conventional Al. That is, since Cu, has superior tolerance or resistance to EM (electro-migration), compared to Al, a low electrical resistance enables [to reduce a] a reduction in signal delay or a decrease in level due to a wiring resistance. Therefore, it can be used under high current density. Specifically, by using this, the permissible current density can be released or enlarged up to three times, and the wiring width can also be made fine or minute.

Paragraph at Page 3, Lines 9-18

The present invention is based on what has been acknowledged above, and according to the present invention, there is provided a method for forming a coating film, comprising the following steps: applying a raw material of a low dielectric constant onto a surface of a plate-like material to be treated such as a semiconductor wafer or a glass substrate; reducing the oxygen concentration in the atmosphere surrounding the plate-like material to less than or equal to 1% before the surface temperature of the plate-like material to be treated rises to 200°C; thereafter heating the plate-like material to [be treated to] a temperature greater than or equal to 400°C while maintaining the oxygen concentration at less than or equal to 1%; and then maintaining the oxygen concentration in the atmosphere at less than or equal to 1% until the surface temperature of the plate-like material to be treated lowers to 200°C.

Paragraph at Page 4, Lines 18-21

Although not shown in the figure, in this apparatus are provided a window portion, which can be freely opened or closed for moving the plate-like material to be treated W in and out, [and] a gas supply conduit for supplying an atmospheric gas such as N_2 gas, and a gas discharge conduit for discharging the atmospheric gas from within the apparatus.

Paragraph at Page 11, Lines 2-10

In a case of using at least one kind selected among alkylene glycol dialkyl ether without using alcohol as a solvent, since alcohol corresponding to the alkoxy group is inevitably generated in the course of the hydrolysis of alkoxysilane, it is necessary to remove the generated alcohol from the reaction system. Specifically, it is necessary to remove the alcohol to be less than or equal to 15 weight % in this coating liquid, or more preferably, to be less than or equal to 8 weight %. If the alcohol exceeds 15 weight %, the H-Si group and the generated alcohol react with each other, an RO-Si group is generated, and thereby the cracking limit is deteriorated. In addition, gas is generated at the time of forming a coating film, and thereby the trouble mentioned above occurs.